

CLAIMS

1. A digital radiography imager, comprising:
an energy detection layer;
and
an x-ray converting layer disposed above the energy detection layer,
wherein the x-ray converting layer has a first surface adjacent to the energy
detection layer and a second surface on an opposite side to the energy detection
layer, and wherein the digital radiography imager is configured such that x-rays
traverse the energy detection layer before propagating through the x-ray converting
layer.
2. The digital radiography imager of claim 1, wherein an intensity level
corresponding to the x-rays received by the imager is greater near the first surface
relative to the second surface of the energy converting layer.
3. The digital radiography imager of claim 2, wherein the x-ray converting layer
comprises a scintillating material to produce visible light from x-rays.
4. The digital radiography imager of claim 3, wherein the energy detection layer
comprises photodiodes to detect the visible light.
5. The digital radiography imager of claim 2, wherein the x-ray converting layer
comprises a semiconductor material to draw electrical charges across the
semiconductor material.
6. The digital radiography imager of claim 2, wherein the x-ray converting layer
comprises a photoconductor material to produce electrical charges across the
semiconductor material.

7. The digital radiography imager of claim 5, wherein the energy detection layer comprises a plurality of charge-collection electrodes to collect the electrical charges.
8. The digital radiography imager of claim 1, further comprising a protective layer disposed below the energy detection layer.
9. The digital radiography imager of claim 8, further comprising a substrate layer disposed between the energy detection layer and the protective layer.
10. A flat panel imager, comprising:
 - a photodiode layer ;
 - a light transparent layer disposed above the photodiode layer; and
 - a scintillator layer disposed above the light transparent layer, wherein the scintillator layer has a first surface adjacent to the light transparent layer and a second surface on an opposite side of the light transparent layer, and wherein the flat panel imager is configured such that x-rays traverse the photodiode layer before propagating through the scintillator layer.
11. The flat panel imager of claim 10, wherein a light intensity generated by the scintillator layer is greater near the first surface of the scintillator layer adjacent to the light transparent layer relative to the second surface of the scintillator layer.
12. The flat panel imager of claim 11, wherein the photodiode layer comprises a CCD-based sensor.
13. The flat panel imager of claim 11, wherein the photodiode layer comprises a CMOS-based sensor.

14. The flat panel imager of claim 11, further comprising a TFT layer disposed below the photodiode layer.
15. The flat panel imager of claim 10, wherein the scintillator layer comprises a phosphor scintillator.
16. The flat panel imager of claim 10, wherein the scintillator layer comprises a cesium iodide scintillator.
17. The flat panel imager of claim 10, wherein a mirror layer is disposed above the scintillator layer.
18. The flat panel imager of claim 17, wherein a protective layer is disposed below the photodiode layer.
19. The flat panel imager of claim 18, wherein a substrate layer is disposed between the protective layer and the photodiode layer.
20. The flat panel imager of claim 19, further comprising a casing that holds the flat panel imager together, wherein the casing forms an aperture window to receive x-rays.
21. A flat panel imager, comprising:
 - a semiconductor layer disposed above a charge-collection layer; and
 - a bias electrode layer disposed above the semiconductor layer, the bias electrode to generate an electric field within the semiconductor layer, wherein the semiconductor layer has a first surface adjacent to the charge-collection layer and a second surface adjacent to the bias electrode, and wherein the flat panel imager is

configured such that x-rays traverse the charge-collection layer before propagating through the semiconductor layer.

22. The flat panel imager of claim 21, wherein electric charges drawn across the semiconductor layer is greater near the first surface of the semiconductor layer adjacent to the charge-collection layer relative to the second surface of the charge-collection layer.

23. A flat panel imager of claim 21, further comprising a TFT matrix layer disposed below the charge-collection layer.

24. The flat panel imager of claim 21, wherein the semiconductor layer comprises an amorphous selenium material.

25. The flat panel imager of claim 21, wherein the charge-collection layer comprises a plurality of charge-collection electrodes.

26. The flat panel imager of claim 22, further comprising a casing that holds the flat panel imager together, wherein the casing forms an aperture window to receive x-rays.

27. A digital radiography system, comprising:

an x-ray source to transmit x-rays;

a flat panel imager to receive the x-rays and to produce a digitized image, comprising:

a photodiode layer;

a light transparent layer disposed above the photodiode layer;

a scintillator layer disposed above the light transparent layer;

and

a mirror layer disposed above the scintillator layer; and
a display system connected to the flat panel imager, the display system to display the digitized image, wherein the scintillating layer has a first surface adjacent to the light transparent layer and a second surface adjacent to the mirror layer, and wherein the flat panel imager is configured such that x-rays traverse the photodiode layer before propagating through the scintillator layer.

28. The system of claim 27, wherein a light intensity generated by the scintillator layer is greater near the first surface of the scintillator layer adjacent to the light transparent layer relative to the second surface of the scintillator layer.

29. The system of claim 27, wherein the photodiode comprises a CCD-based sensor.

30. The system of claim 27, wherein the photodiode comprises a CMOS-based sensor.

31. The flat panel imager of claim 27, further comprising a casing that holds the flat panel imager together, wherein the casing forms an aperture window to receive x-rays.

32. A digital radiography system, comprising:

an x-ray source to transmit x-rays;

a flat panel imager to receive the x-rays and to produce a digitized image, comprising:

a semiconductor layer disposed above a charge-collection layer;

and

a bias electrode layer disposed above the semiconductor layer,
the bias electrode to generate an electric field within the semiconductor layer;
and

a display system connected to the flat panel imager, the display system
to display the digitized image, wherein the semiconductor layer has a first surface
adjacent to the charge-collection layer and a second surface adjacent to the bias
electrode, and wherein the flat panel imager is configured such that x-rays traverse
the charge-collection layer before propagating through the semiconductor layer.

33. The system of claim 32, wherein electric charges drawn across the
semiconductor layer is greater near the first surface of the semiconductor layer
adjacent to the charge-collection layer relative to the second surface of the charge-
collection layer.

34. The digital radiography system of claim 32, wherein the flat panel imager is a
TFT-based imager.

35. The digital radiography system of claim 32, wherein the flat panel imager is a
CCD-based imager.

36. The flat panel imager of claim 33, further comprising a casing that holds the
flat panel imager together, wherein the casing forms an aperture window to receive
x-rays.

37. An imaging method, comprising:
transmitting x-rays through a photosensitive device; and
receiving the x-rays incident on a scintillator layer after the
transmission through the photosensitive device.

38. The method of claim 37, wherein the scintillator layer is disposed above the photosensitive layer, the scintillator layer having a first surface adjacent to the photosensitive device and a second surface farther away from the photosensitive device relative to the first surface, and wherein receiving further comprises receiving the x-rays at the first surface of the scintillator layer before the x-rays propagate through the scintillator layer.

39. The method of claim 38, wherein receiving further comprises generating a greater light intensity near the first surface of the scintillator layer adjacent to the photosensitive device relative to the second surface of the scintillator layer.

40. The method of claim 39, further comprising detecting by the photosensitive device visible light generated from the scintillator layer.

41. The method of claim 40, wherein a mirror layer is disposed adjacent to the second surface of the scintillator layer.

42. The method of claim 41, wherein a substrate layer is disposed below the photosensitive layer.

43. The method of claim 42, wherein a protective layer is disposed below the substrate layer.

44. An imaging method, comprising:
transmitting x-rays through a charge collection-layer; and
receiving the x-rays incident on a semiconductor layer after the transmission through the charge-collection layer.

45. The method of claim 44, wherein the semiconductor layer is disposed above the charge-collection layer, the semiconductor layer having a first surface adjacent to the charge-collection layer and a second surface farther away from the charge-collection layer relative to the first surface, and wherein receiving further comprises receiving the x-rays at the first surface of the semiconductor layer before the x-rays propagate through the semiconductor layer.
46. The method assembly of claim 45, further comprising generating an electrical field within the semiconductor layer.
47. The method assembly of claim 46, wherein receiving further comprises generating a greater electrical charge near the first surface of the semiconductor layer adjacent to the charge-collection layer relative to the second surface of the semiconductor layer.
48. The method of claim 47, further comprising detecting by the charge-collection layer electrical charges drawn across the semiconductor layer.
49. The method of claim 48, wherein a mirror layer is disposed above the semiconductor layer.
50. The method of claim 49, wherein a protective layer is disposed below the charge-collection layer.